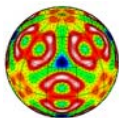


U.S. Department of Energy Experimental Program to Stimulate Competitive Research (DOE EPSCoR)

Tim Fitzsimmons, Ph.D
DOE EPSCoR Acting Program Manager
Materials Sciences and Engineering Division
Office of Basic Energy Sciences
Office of Science

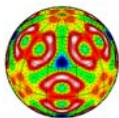


<http://www.sc.doe.gov/bes/EPSCoR/index.html>



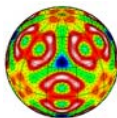
So What is EPSCoR?

- The **Experimental Program to Stimulate Competitive Research** is mandated by Congress to
 - to enhance the competitiveness of the peer-review process within academic institutions *in eligible States*
 - to increase the probability of long-term growth of competitive funding to investigators at institutions *from eligible States*



The EPSCoR Mandate (Continued)

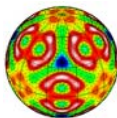
- “EPSCoR shall provide for activities which may include (but not be limited to) competitive research awards and graduate traineeships.”
- “EPSCoR shall assist those States that--
 - (I) historically have received relatively little Federal research and development funding; and
 - (II) have demonstrated a commitment to develop their research bases and improve science and engineering research and education programs at their universities and colleges.”



Which States?

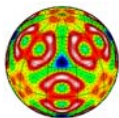


Current Basis of DOE EPSCoR eligibility – we use the NSF criteria defined at:
<http://www.nsf.gov/od/oia/programs/epscor/eligible.jsp>



DOE EPSCoR

- DOE EPSCoR is a federal-state partnership program
 - DOE EPSCoR solicitations are designed to help in meeting our energy research and development needs through increased competition in energy-related research and development.
 - The principal objective of the DOE EPSCoR program is to enhance the abilities of the designated states and territories* to develop their science and engineering resources in energy related areas and compete for research funding.
 - Managed within the Office of Science, DOE EPSCoR supports basic and applied research activities spanning the broad range of science and technology programs within DOE, and demonstrates a wide-ranging research portfolio including: Advanced Scientific Computing, Basic Energy Sciences, Biological and Environmental Research, Fusion Energy Sciences, High Energy Physics, Renewable Energies, Nuclear Energy and Fossil Energy.
 - DOE EPSCoR supports a modest and adequate average annual budget of \$8 million per year with Notices for funding opportunities bi-annually**. In FY2008 Congress appropriated \$15 million for DOE/EPSCoR. The FY 2009 request for DOE/EPSCoR is \$8 Million.
- * Presently DOE/EPSCoR is using the NSF EPSCoR eligibility criteria under which there are twenty-five states and two territories eligible for support.
- ** Basis – linear extrapolation of the President's Budget request.



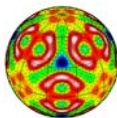
DOE EPSCoR Goals and Funding Mechanisms

DOE EPSCoR Goals are 3-fold. DOE EPSCoR seeks to:

1. Improve the capability of designated states and territories to conduct sustainable and nationally competitive energy-related research;
2. Jumpstart infrastructure development in designated states and territories through increased human and technical resources, training scientists and engineers in energy-related areas; and
3. Build beneficial relationships of designated states and territories with the 10 world class national laboratories managed by the Office of Science, leveraging DOE national user facilities and intellectual collaboration.

DOE EPSCoR Funding Mechanisms are 2-fold: DOE EPSCoR uses two principal funding mechanisms:

1. Implementation Grants (for a larger group of scientists with one research theme)
2. DOE EPSCoR-State/National Laboratory Grants (for one principal investigator or a small group)



DOE EPSCoR Funding Mechanism -Features

Implementation Grants

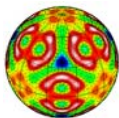
Implementation grants are for a maximum period of six years with an initial grant period of three years for multiple researchers.

- Maximum funding for Implementation Grants is \$750,000 per year.
- Fifty percent state matching funds are required.
- Only one application per state is allowed.
- Only one research 'cluster' (group of scientist working on a common theme) important to state and DOE EPSCoR goals.

EPSCoR-State/National Laboratory Partnership Grants

The *EPSCoR-State/National Laboratory Partnership Grants* are for a maximum period of three years for one principal investigator.

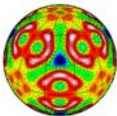
- Maximum funding for these grants is \$150,000 per year. No funding to national laboratories. Ten percent state matching funds are required.
- Multiple applications per state allowed & endorsed by state required.
- Multiple applications per national laboratory allowed.
- Collaborative research with national laboratory required.
- Training of students, postdocs encouraged.
- Program office and national laboratory reviews.



DOE EPSCoR Program

Distinguishing Features:

- Science-driven, merit-based program underpinning broadly-defined energy missions, scientific excellence and innovation
- Supports a broad range of science and technology programs within DOE
- Selects the most meritorious proposals based on merit and peer review.
- Places high priority on support of young faculty, postdoctoral associates, graduate and undergraduate students and their collaboration with DOE national laboratories
- Emphasizes building partnerships at DOE national laboratories to leverage unique scientific and technical capabilities
- Holds workshops and discussions with representative scientists from EPSCoR states to acquaint them with the user facilities, centers of excellence, and personnel at the national laboratories
- Strives to engage other programs within the Department of Energy by encouraging participation by program managers from other offices in the review processes and the co-funding of the successful proposals.



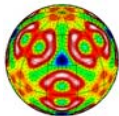
DOE EPSCoR Program

Deliverables:

- Increase geographical balance of energy related resources and talent across the nation; increased number of scientists and engineers
- Expected success at obtaining outside sustained research funding following implementation award
- High impact results/publications
- Important discoveries impacting others' research

General Information:

- All project funds will reside within an EPSCoR state and may include more than one EPSCoR state.



DOE ESPCoR Portfolio

- **27 State National Laboratory Partnership awards**
- **11 Implementation awards**
- **Breadth of DOE programmatic research areas and participating DOE Laboratories supported by the EPSCoR Program**
- **Research Areas Supported** (*varies depending on proposals*)

Advanced Scientific Computing

Biological Sciences

Chemical Sciences

Coal and Power Systems

Nuclear Energy

Environmental Sciences

Fusion Energy Sciences

High Energy and Nuclear Physics

Materials Sciences

Fossil Energy

- **National Laboratories Participating** (*open to all – participation varies depending on collaborations*)

Los Alamos National Lab (LANL)

National Renewal Energy Lab (NREL)

Oak Ridge National Lab (ORNL)

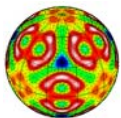
Princeton Plasma National Lab (PPNL)

National Energy Technology Lab (NETL)

Fermi National Accelerator Lab (FNAL)

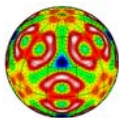
Pacific Northwest National Lab (PNNL)

Lawrence Livermore National Lab (LLNL)



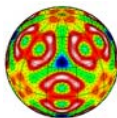
Recent DOE EPSCoR News and Upcoming Events

- EPSCoR-State/National Laboratory Partnership Awards. Solicitation 07-15. 197 preapplications resulted in 79 full proposals. DOE announced 12 awards in April 2008.
- Implementation Awards, FY 2008. Solicitation 08-04. To be announced in Summer 2008.
- DOE/EPSCoR-Annual Meeting. To be held this summer at DOE's Oak Ridge National Laboratory, Oak Ridge, TN on July 22-24, 2008. Details at posted at:
 - <https://www.ornl.gov/epscor2008/>



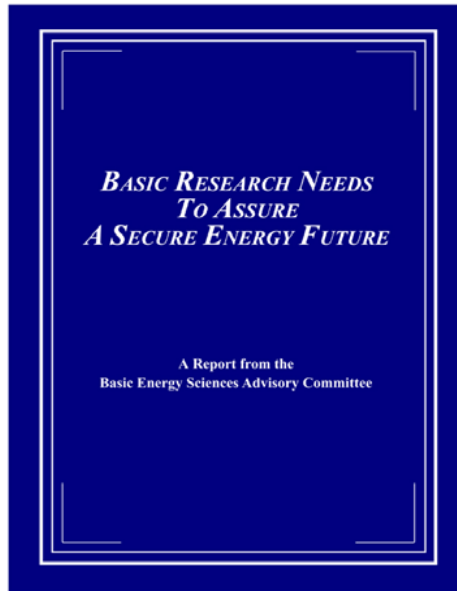
Beyond EPSCoR

- Basic Research Needs Workshop Series
- Energy Frontiers Research Centers
- Single Investigator and Small Group Research



A Retrospective View of A Remarkable Journey- *Defining the Science Directions*

Basic Research Needs To Assure A Secure Energy Future

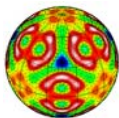


*BESAC Basic Research Needs to
Assure A Secure Energy Future
Report
February 2003*

Current projections estimate that the energy needs of the world will more than double by the year 2050. This is coupled with increasing demands for “clean” energy—sources of energy that do not add to the already high levels of carbon dioxide and other pollutants in the environment. These enormous challenges cannot be fully met by existing technologies, and scientific breakthroughs will be required to provide reliable, economic solutions for our future energy security

This seminal workshop report indentified the broad basic research directions that will help provide the major scientific discoveries necessary for major technological changes in the largest industries in the world—those responsible for energy production and use.

The findings of this 2003 report gave birth to a series of ten follow-on *Basic Research Needs* workshops over the next five years, which together attracted more than 1,500 participants from universities, industry, and Department of Energy laboratories. These reports provide in-depth analyses on how the work of the scientific community can further our Nation’s most challenging energy missions.

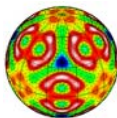


Basic Research Needs Workshops:

Help Define Research Directions and Provide the Links to Societal Needs

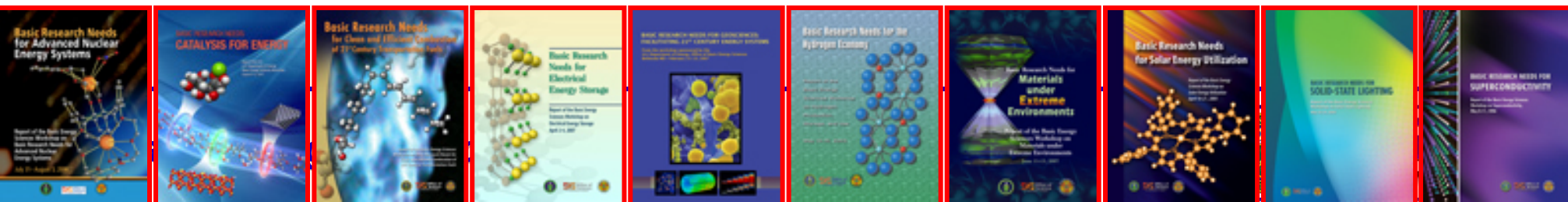


- Basic Research Needs for a Secure Energy Future (BESAC)
- Basic Research Needs for the Hydrogen Economy
- Basic Research Needs for Solar Energy Utilization
- Basic Research Needs for Superconductivity
- Basic Research Needs for Solid State Lighting
- Basic Research Needs for Advanced Nuclear Energy Systems
- Basic Research Needs for the Clean and Efficient Combustion of 21st Century Transportation Fuels
- Basic Research Needs for Geosciences: Facilitating 21st Century Energy Systems
- Basic Research Needs for Electrical Energy Storage
- Basic Research Needs for Materials under Extreme Environments
- Basic Research Needs for Catalysis for Energy Applications



Topical Grand Challenges- From the BRN Workshops

- **New materials discovery, design, development, and fabrication**, especially materials that perform well under extreme conditions
- **Science at the nanoscale, especially low-dimensional systems** that promise materials with new and novel properties
- **Methods to “control” photon, electron, ion, and phonon transport in materials** for next-generation energy technologies
- **Structure-function relationships** in both living and non-living systems
- **Designer catalysts**
- **Interfacial science and designer membranes**
- **Bio-materials and bio-interfaces**, especially at the nanoscale where soft matter and hard matter can be joined
- **New tools for:**
 - **Spatial characterization**, especially at the atomic and nanoscales and especially for in-situ studies
 - **Temporal characterization** for studying the time evolution of processes
 - **Theory and computation**
 - **Synthesis, crystal growth**



Energy Frontier Research Centers will bring together the skills and talents of multiple investigators to enable research of a scope and complexity that would not be possible with the standard individual-investigator or small-group award.

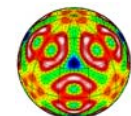


The DOE Office of Science, Office of Basic Energy Sciences, announced the Energy Frontier Research Centers (EFRCs) program. Pending appropriations, up to \$100M will be available in FY2009 for EFRC awards that are \$2–5 million/year for an initial 5-year period. Universities, labs, nonprofits, and for-profit entities are eligible to apply.

Energy Frontier Research Centers will pursue fundamental research that addresses both energy challenges and science grand challenges in areas such as:

- Solar Energy Utilization
- Catalysis for Energy
- Electrical Energy Storage
- Solid State Lighting
- Superconductivity
- Bioenergy and biofuels
- Geosciences for Nuclear Waste and CO₂ Storage
- Advanced Nuclear Energy Systems
- Combustion of 21st Century Transportation Fuels
- Hydrogen Production, Storage, and Use
- Materials Under Extreme Environments

EFRC Funding Opportunity Announcement was published on April 4, 2008. See: <http://www.sc.doe.gov/bes/EFRC.html>



Single-Investigator and Small-Group Research

Tackling our energy challenges in a new era of science

- Pending appropriations, up to \$60M will be available for single-investigator and small-group awards in FY2009.
- BES seeks applications in two areas: grand challenge science and energy challenges identified in one of the Basic Research Needs workshop reports.
- Awards are planned for three years, with funding in the range of \$150-300k/yr for single-investigator awards and \$500-1500k/yr for small-group awards (except as noted below)

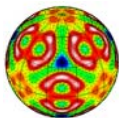
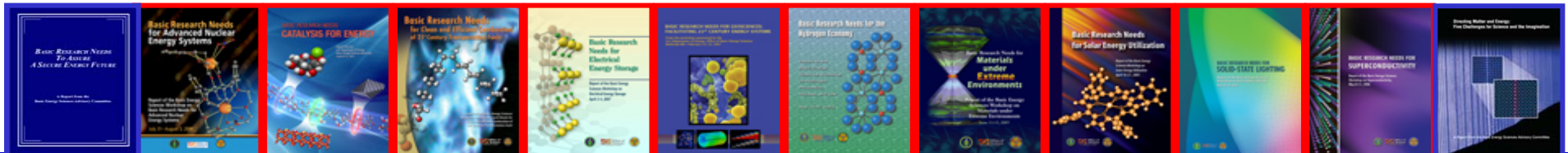
- Areas of interest include:

Grand challenge science: ultrafast science; chemical imaging, complex & emergent behavior

Tools for grand challenge science: midscale instrumentation; accelerator and detector research (awards capped at \$5M over 3-year project duration)

Use inspired discovery science: basic research for electrical energy storage; advanced nuclear energy systems; solar energy utilization; hydrogen production, storage, and use; geological CO₂ sequestration; other basic research areas identified in BESAC and BES workshop reports with an emphasis on nanoscale phenomena

- For full details see: <http://www.sc.doe.gov/bes/SISGR.html>



THANK YOU

<http://www.sc.doe.gov/bes/EPSCoR/index.html>

